Research Article

# New distributional record of *Prodecatoma philodendri* Ferrière (Hymenoptera: Eurytomidae), with a checklist of *Prodecatoma* Ashmead species and new host plant family for the genus

Nuevo registro de distribución para *Prodecatoma philodendri* Ferrière (Hymenoptera: Eurytomidae), con una lista de las especies de *Prodecatoma* Ashmead y una nueva familia de planta hospedera para el género

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ZooBank: urn:lsid:zoobank.org:pub: 35AADCFA-FF22-40E9-BA5A-A9CDB0C1D306
https://doi.org/10.35249/rche.45.3.19.21

**Abstract.** In the present note, we document an extension of the geographic range of *Prodecatoma philodendri* Ferrière, 1924 to the state of São Paulo, Brazil, based on examination of specimens obtained in fruits of *Philodendron bipinnatifidum* Schott ex Endl. (Araceae) in the locality "Sertão do Cacau", municipality of São Sebastião, state of São Paulo, Brazil. Also, we provide a list of *Prodecatoma* species, with their distribution and the known host plants. In addition, we discuss a new host plant family for *Prodecatoma*, which reinforces the thesis that the species of the genus presents a phytophagous habit.

**Key words:** Acanthaceae, Chalcidoidea, *Philodendron bipinnatifidum*, phytophagy, *Prodecatoma philodendri*.

**Resumen.** Esta nota informa sobre la extensión del rango de distribución geográfica de *Prodecatoma philodendri* Ferrière, 1924 en el estado de São Paulo, Brasil, basados en el estudio de especímenes obtenidos de frutos de *Philodendron bipinnatifidum* Schott ex Endl. (Araceae) en la localidad "Sertão do Cacau", municipio de São Sebastião, estado de São Paulo, Brasil. Se proporciona una lista de las especies de *Prodecatoma*, con su distribución y plantas hospederas conocidas. También se presenta una nueva familia de planta hospedante para *Prodecatoma*, hecho que refuerza la tesis de que las especies del género tienen hábito fitófago.

**Palabras clave:** Acanthaceae, Chalcidoidea, fitofagia, *Philodendron bipinnatifidum*, *Prodecatoma philodendri*.

## Introduction

In 2007, Lotfalizadeh *et al*. redefined *Prodecatoma* Ashmead, 1904 (Hymenoptera, Eurytomidae) and proposes that its species have phytophagous habits and are restricted to the Neotropical Region. According to these authors several oriental and afrotropical species of the genus have been erroneously classified. Thus *Prodecatoma* includes 19 described species of which 14 are known to occur in Brazil (Table 1).

Received 23 July 2019 / Accepted 1 September 2019 / Published online 20 September 2019
Responsible Editor: José Mondaca E.

**Table 1.** List of *Prodecatoma* Ashmead, 1904 (Hymenoptera: Eurytomidae) species *sensu* Lotfalizadeh *et al.* (2007), with distributional and host plant data.

| ***Prodecatoma* species** | **Distribution** | **Host plant** | **References** |
|---|---|---|---|
| *P. bruneiventris* Ashmead, 1904 | Brazil (MT, PA) | unknown | Ashmead (1904) |
| *P. carpophaga* Dal Molin *et al.*, 2004 | Brazil (PR, RS) | *Psidium cattleianum* Sabine (Myrtaceae) (in fruit galls) | Dal Molin *et al.* (2004) |
| *P. cooki* (Howard, 1896) | Venezuela, Mexico, EUA, Austria | *Vitis vinifera* L., *Vitis* sp., *Partenocissus quinquefolia* (L.) Planch., *Cissus tiliacea* H.B.K. (Vitaceae) (in seeds) | Cortez-Madrigal *et al.* (2012) |
| *P. couridae* Cameron, 1913 | Guiana | *Avicennia* spp. (Acanthaceae*, see discussion in text) (in leaf galls) | Cameron (1913) |
| *P. cruzi* Costa Lima, 1914 | Brazil (RJ) | *Bambusa* sp. (Poaceae) (in stems) | Costa Lima (1914) |
| *P. diospyri* Muesebeck, 1932 | Mexico | *Diospyros ebenaster* Retziuz (Ebenaceae) (in fruits) | Muesebeck (1932) |
| *P. ferruginea* Dal Molin *et al.*, 2004 | Brazil (PR) | *Psidium cattleianum* Sabine and *Psidium cireneum* Mart. ex DC. (Myrtaceae) (in fruit galls) | Dal Molin *et al.* (2004) |
| *P. flavescens* Ashmead, 1904 | Brazil | unknown | Ashmead (1904) |
| *P. geraldoi* Perioto and Lara, 2007 | Brazil (SP) | *Eugenia uniflora* L. (Myrtaceae) (in fruits) | Perioto and Lara (2007) |
| *P. juliae* Perioto and Lara, 2007 | Brazil (SP) | *Ilex affinis* Gardner (Aquifoliaceae) (in fruits) | Perioto and Lara (2009) |
| *P. latilineata* Cameron, 1913 | Guiana | *Smilax* sp. (Smilacaceae) (in leaf galls) | Cameron (1913) |
| *P. maculiventris* (Ashmead in Riley *et al.*, 1894) | Colombia, Saint Vincent and the Grenadines | unknown | Ashmead in Riley *et al.* (1894) |
| *P. moreirai* Bondar, 1930 | Brazil (BA) | *Genipa americana* L. (Rubiaceae) (in seeds) | Bondar (1930a) |
| *P. nigra* Ashmead, 1904 | Brazil (PA) | unknown | Ashmead (1904) |
| *P. petrodoma* Dal Molin *et al.*, 2004 | Brazil (PA) | *Psidium cireneum* Mart. ex DC. (Myrtaceae) (in fruit galls) | Dal Molin *et al.* (2004) |
| *P. philodendri* Ferrière, 1924 | Brazil (PE, SP**), Panama, Paraguay | *Philodendron hederaceum* var. oxycardium (Schott) Croat (= *P. oxycardium* Schott), *Philodendron tweedieanum* Schott (= *P. dubium* Chodat & Vischer) and *Philodendron bipinnatifidum* Schott ex Endl. (= *P. selloum* K. Koch) (Araceae) (in fruits) | Ferrière (1924); De Santis (1979) |
| *P. solani* Bondar, 1930 | Brazil (BA) | *Basanacantha* sp. (Rubiaceae) (in seeds) | Bondar (1930b) |
| *P. spermophaga* Costa Lima, 1928 | Colombia, Brazil (BA, RJ, SP, PR) | *Psidium* sp and *Eugenia unifora* L. (= *Eugenia costata* = *Stenocalyx costatus*) (Myrtaceae) (in seeds); *Canavalia ensiformes* (L.) DC. (Fabaceae) (in seeds); *Chomelia* sp. (Rubiaceae), *Eugenia* and *Psidium* (Myrtaceae) and *Guarea trichiloides* (Meliaceae) (in fruits); *Psidium cattleianum* Sabine e *Psidium cireneum* Mart. ex DC. (Myrtaceae) (in fruit galls).<br>Dal Molin *et al.* (2004) suggest that *P. spermophaga* acts as inquilines in galls or even parasitoids of gallers. | Bondar (1916); Costa Lima (1928); Bondar (1930a) and Dal Molin *et al.* (2004) |
| *P. thoracica* Ashmead, 1904 | Brazil (PA) | unknown | Ashmead (1904) |

BA= Bahia; MT= Mato Grosso, PA= Pará; PE= Pernambuco; PR= Paraná; RJ= Rio de Janeiro; RS= Rio Grande do Sul; SP= São Paulo

*= new host plant family; **= new distributional record

The idea that the phytophagy in *Prodecatoma* is a generic feature is not new: Ferrière (1924) suggested this when describing *Prodecatoma philodendri*. At that time the phytophagy of *Prodecatoma cooki* (Howard, 1896), *Prodecatoma couridae* Cameron, 1913 and *Prodecatoma latilineata* Cameron, 1913 was already known (Howard 1896; Cameron 1913). The phytophagy of *Prodecatoma* was also supported by Burks (1971) that suggested that all species of *Prodecatoma* are phytophagous.

Costa Lima (1914) stated that *Prodecatoma cruzi* act as egg parasitoid of *Erethistes lateralis* (Boheman, 1836 *in* Schoenherr, 1836) (Coleoptera: Curculionidae), but this fact requires confirmation since egg parasitism is not a common habit among the Eurytominae.

Herein we provide a new distributional record to *Prodecatoma philodendri* Ferrière (1924), a checklist of *Prodecatoma* species and evidence of a new host plant family for the genus.

## Material and Methods

Were captured twenty-six females, five males, and a gynandromorph exemplar of *Prodecatoma* that emerged from a fruit of *Philodendron bipinnatifidum* Schott ex Endl. The capture of exemplars of *Prodecatoma* occurred between 1st and 3rd March 2014 in the garden of a house in the locality "Sertão do Cacau" (23°46'04" S, 45°38'00" W), municipality of São Sebastião, on the northern coast of state of São Paulo. Specimens were kept in glass vial with 100% ETOH and forwarded to the Laboratório de Sistemática e Bioecologia de Predadores e Parasitoides do Instituto Biológico, in Ribeirão Preto, state of São Paulo, Brazil, for identification.

The generic identification was made using the key supplied by Burks (1971), and the specific determination by comparison to the original description of *Prodecatoma philodendri* made by Ferrière (1924).

The observations were performed using a stereomicroscope (Leica MZ 9.5, Leica Microsystems, Switzerland) with a fluorescent light source. Color images were obtained using a digital camera (Leica DFC295, Leica Microsystems, Germany) attached to a stereomicroscope (Leica M205C APO, Leica Microsystems, Singapore) and specimens illuminated with high diffuse dome illumination (Leica LED5000 HDI, Leica Microsystems, China). Focus stacking of images was done using Helicon Focus (version 5.3). The figures were prepared using Adobe Photoshop (version 11.0).

The voucher specimens examined in this study have been deposited in the Coleção Entomológica do Laboratório de Sistemática e Bioecologia de Predadores e Parasitoides (LRRP #781-813), of the Instituto Biológico (Ribeirão Preto, SP, Brazil), N.W. Perioto, curator, as well as four females and two males (MZUSP #55877-55882) in the Coleção de Hymenoptera of the Museu de Zoologia da Universidade de São Paulo (MZSP) (São Paulo, SP, Brazil), C.R.F. Brandão, curator. The collections were done under a Brazilian Biodiversity Information and Authorization System (SISBIO) license#16473-1.

## Results and Discussion

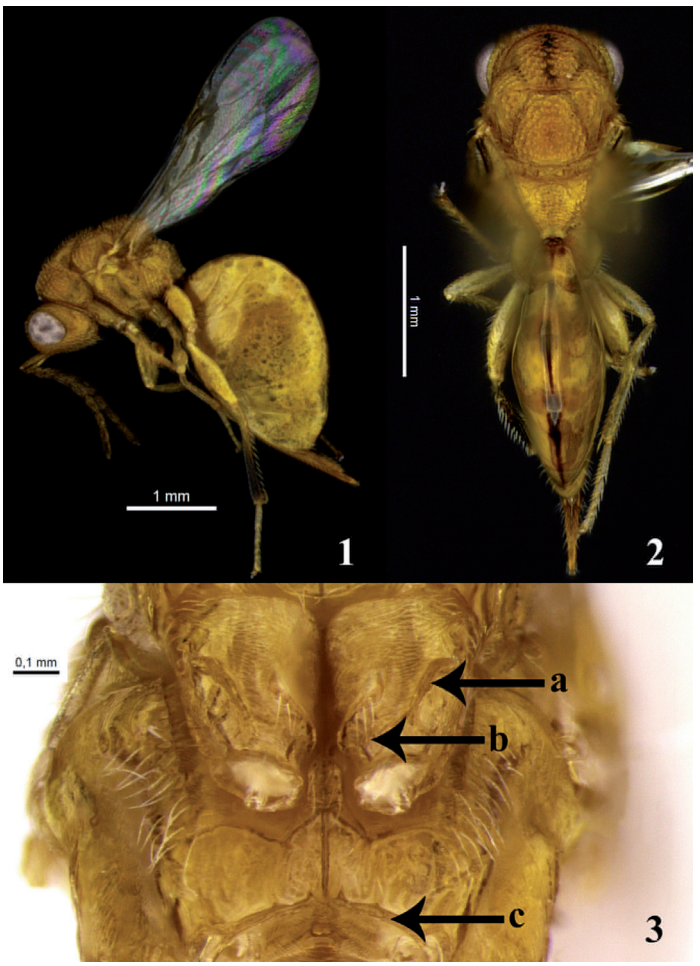
*Prodecatoma philodendri* Ferrière, 1924
(Figs. 1-3)

**Material examined.** 26 females, 5 males and 1 gynandromorph exemplar, Brasil, SP, São Sebastião, 23°46'3,39"S / 45°37'59,82"W, ex. fruto *Philodendron bipinnatifidum* (Araceae), 1-3. III.2014, NW Perioto, leg., LRRP #781-813.

In this paper, we document a new distributional record, which extends the geographic range of *Prodecatoma philodendri* to state of São Paulo, Brazil, about 1,200 km SW from

Ypacaraí Lake, Paraguay (Ferrière 1924; De Santis 1979) the type locality; about 5,200 km NW from Barro Colorado, Panamá (Lotfalizadeh *et al*. 2007) and 1,900 km NE from state of Pernambuco, Brazil (De Santis 1989), the previously known distributional records (Fig. 4).

The generic identification is supported by the fact that the species of *Prodecatoma* presents the lower face strigose, with a median carina continued in the interocular space (ITS) and ITS with a widely continuous laminated and discoid projection dorsally in the scrobal depression (Lotfalizadeh *et al*. 2007). There are no revisional papers or updated identification keys for species of *Prodecatoma*. The specific identification was performed by the first author based on: a. the specimens obtained perfectly match the description of *Prodecatoma philodendri* made by Ferrière (1924), whose females are easily recognized by the yellow coloration of the body (Fig. 2), and by the thin longitudinal line of dark coloration on the dorsum of metasoma (Fig. 3); b. the specimens obtained perfectly match the characters stated by Lotfalizadeh *et al*. (2007) for *Prodecatoma philodendri*: the procoxae with an oblique carina and a deep oblique groove, presence of a ventral shelf on mesopleuron that protrudes forward medially (Fig. 3), presence of the transverse petiole and gaster strongly compressed laterally and, c. *Prodecatoma philodendri* is the only known *Prodecatoma* species that develops on *Philodendron* fruits.




**Figures 1-3.** *Prodecatoma philodendri* Ferrière, 1924 (Hymenoptera: Eurytomidae). 1. Habitus, lateral view. 2. Habitus, dorsal view. 3. Mesopleuron: a = oblique carina of procoxa; b = oblique groove of procoxa; c = ventral shaft.

The known hosts of *Prodecatoma philodendri* are *Philodendron hederaceum* var. *oxycardium* (Schott) Croat (Ferrière 1924, as *P. oxycardium*), *Philodendron tweedieanum* Schott and *Philodendron bipinnatifidum* Schott ex Endl. (De Santis 1979, as *P. dubium* and *P. selloum*, respectively). *Philodendron bipinnatifidum* is cultivated as an ornamental plant in Brazil, where it is popularly known as "banana-de-morcego", "banana-de-macaco", "banana-de-imbê" and "guaimbê", among other names (Lorenzi and Souza 1995), and in other countries of South America (Mayo 1991). As these plants are cultivated as ornamentals plants in many places, it is expected that the geographical distribution of *Prodecatoma philodendri* is much more extensive than that reported.

The host plants of four of the 19 species of *Prodecatoma* are not known; in this way it is possible to associate the genus to eight plant families: Aquifoliaceae, Ebenaceae, Fabaceae, Meliaceae, Myrtaceae, Poaceae, Rubiaceae and Vitaceae (Table 1) (Costa Lima 1914, 1928; Ferrière 1924; Bondar 1916, 1930a, 1930b; Muesebeck 1932; Dal Molin *et al*. 2004; Perioto and Lara 2007, 2009).

Herein, we propose Acanthaceae as a new host plant family of *Prodecatoma*. Cameron (1913) stated that *Prodecatoma couridae* were obtained from leaf galls on 'Courida' in British Guiana. The word 'Courida' is related to mangrove trees of genus *Avicennia* L. (Acanthaceae) that are characterized by aerial roots and occur in the intertidal zones of estuarine areas. There are reports of occurrence of two species of *Avicennia* in the Guianas: *Avicennia schaueriana* Stapf & Leechman and *A. germinans* (L.) L. (Acanthaceae) (IUCN 2019). These plants are known to harbor large number of gall morphotypes (Santos *et al*. 2013), which supports the thesis that the name 'Courida' cited by Cameron refers to species of *Avicennia* L. (Acanthaceae).

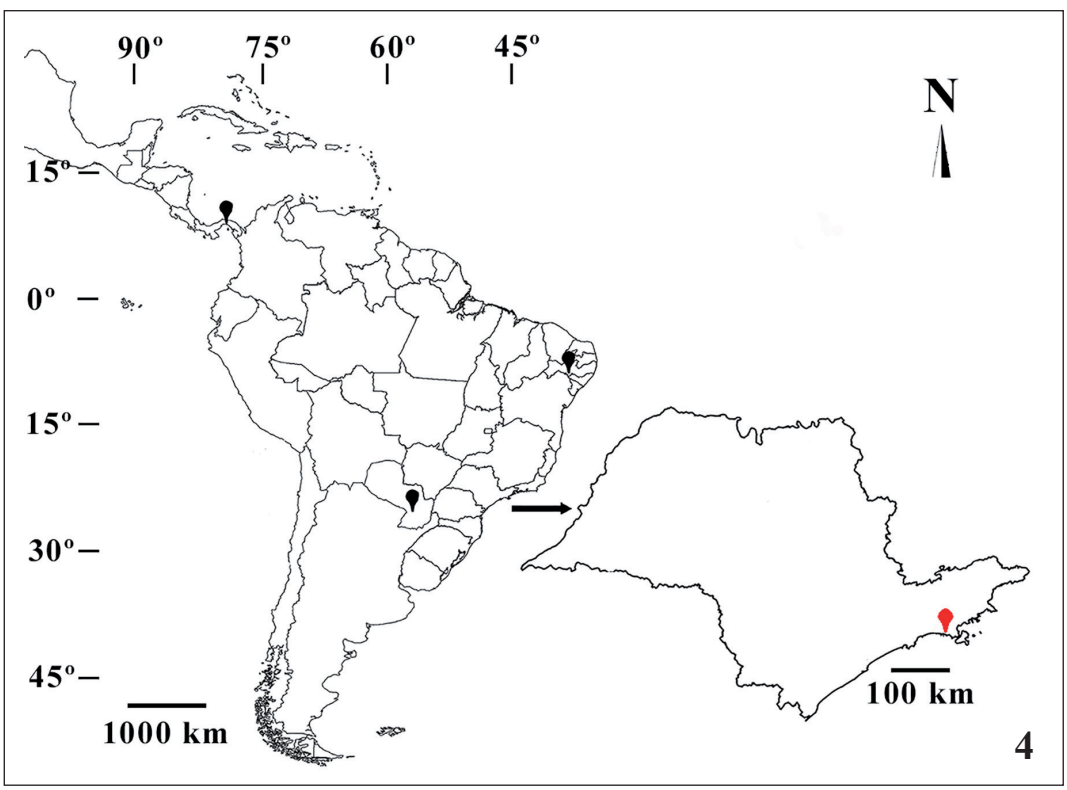



**Figure 4.** Map of Central and South Americas showing the previously known records (black dots) and, in detail, map of state of São Paulo with collection place of *Prodecatoma philodendri* Ferrière, 1924, a new record (in red one).

## Acknowledgements

We thank Dra. Selma Hebling (Centro Universitário Católico de Vitória, ES) for your valuable help in unraveling what Cameron (1913) meant by "Courida"; Dr. Celso Oliveira Azevedo (Universidade Federal do Espírito Santo) and Dr. Valmir Antonio Costa (Instituto Biológico, Campinas) for the critical reading of the manuscript, and to Instituto Nacional de Ciência e Tecnologia dos Hymenoptera Parasitoides (CNPq/Fapesp/Capes) for the financial support.

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